NYS Landfill Regulations

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This Presentation has been revised to remove slides not of interest to NYSDEC.

Our thought process for screening

State Requirement per regulations:

1. Take a sample of the concrete and pea gravel to determine if TENORM exits within our media.

Additional work EPA conducted:

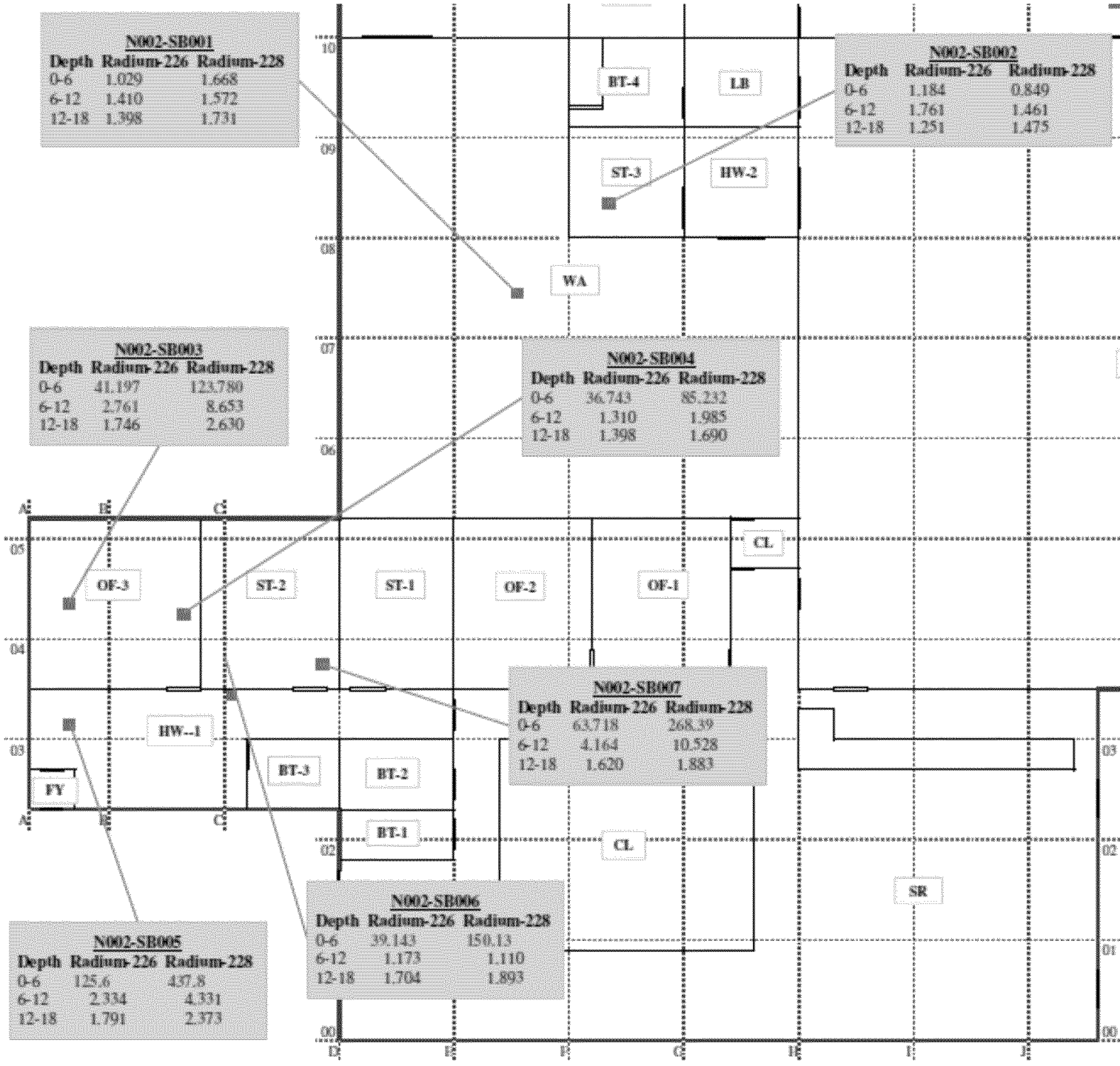
1. Scan 100% of concrete and pea gravel to see if any impact
2. Take a swipe at roughly 5%-10% of concrete to ensure removable contamination does not exist.

Sample of Concrete and Pea gravel

Sampling is the only way to determine if sample is TENORM.

Gross counts of alpha/beta by handheld Instrumentation cannot determine TENORM. It can only detect increase in counts.

Picture of background location/concrete sample location



Concrete Sample

	N002-CC003	
	N002-CC003-01	
	0-6	
	Concrete	
	6/14/2016	
Radioisotope	Value (pCi/g)	Total Uncertainty
Bismuth-212 (Bi-212)	1.146	1.595
Lead-210 (Pb-210)	0.991	2.308
Lead-212 (Pb-212)	0.623	0.181
Potassium-40 (K-40)	7.051	2.401
Radium-226* (Ra-226)	1.075	0.251
Radium-228 (Ra-228)	0.452	0.415
Thallium-208 (Tl-208)	0.253	0.115
Thorium-234 Th-234)	0.521	1.717
Uranium-235 (U-235)	0.148	0.102
Thorium-228 (Th-228)	0.589	0.167
Thorium-230 (Th-230)	0.719	0.181
Thorium-232 Th-232)	0.358	0.113
Uranium-233/234 (U-233/234)	0.692	0.232
Uranium-235/236 (U-235/236)	0.051	0.073
Uranium-238 (U-238)	0.792	0.251

Concrete Background

	N002-CC001	
	N002-CC001-01	
	0-6	
	Concrete	
	7/10/2016	
Radioisotope	Value (pCi/g)	Total Uncertainty
Bismuth-212 (Bi-212)	0.000	0.638
Lead-210 (Pb-210)	-4.012	14.319
Lead-212 (Pb-212)	0.593	0.152
Potassium-40 (K-40)	8.581	1.792
Radium-226* (Ra-226)	0.588	0.146
Radium-228 (Ra-228)	0.443	0.273
Thallium-208 (Tl-208)	0.166	0.070
Thorium-234 Th-234)	1.3609	2.381
Uranium-235 (U-235)	0.0328	0.106
Thorium-228 (Th-228)	0.558	0.210
Thorium-230 (Th-230)	0.439	0.172
Thorium-232 Th-232)	0.274	0.128
Uranium-233/234 (U-233/234)	0.556	0.235
Uranium-235/236 (U-235/236)	0.052	0.096
Uranium-238 (U-238)	0.336	0.173

Conclusion from Samples

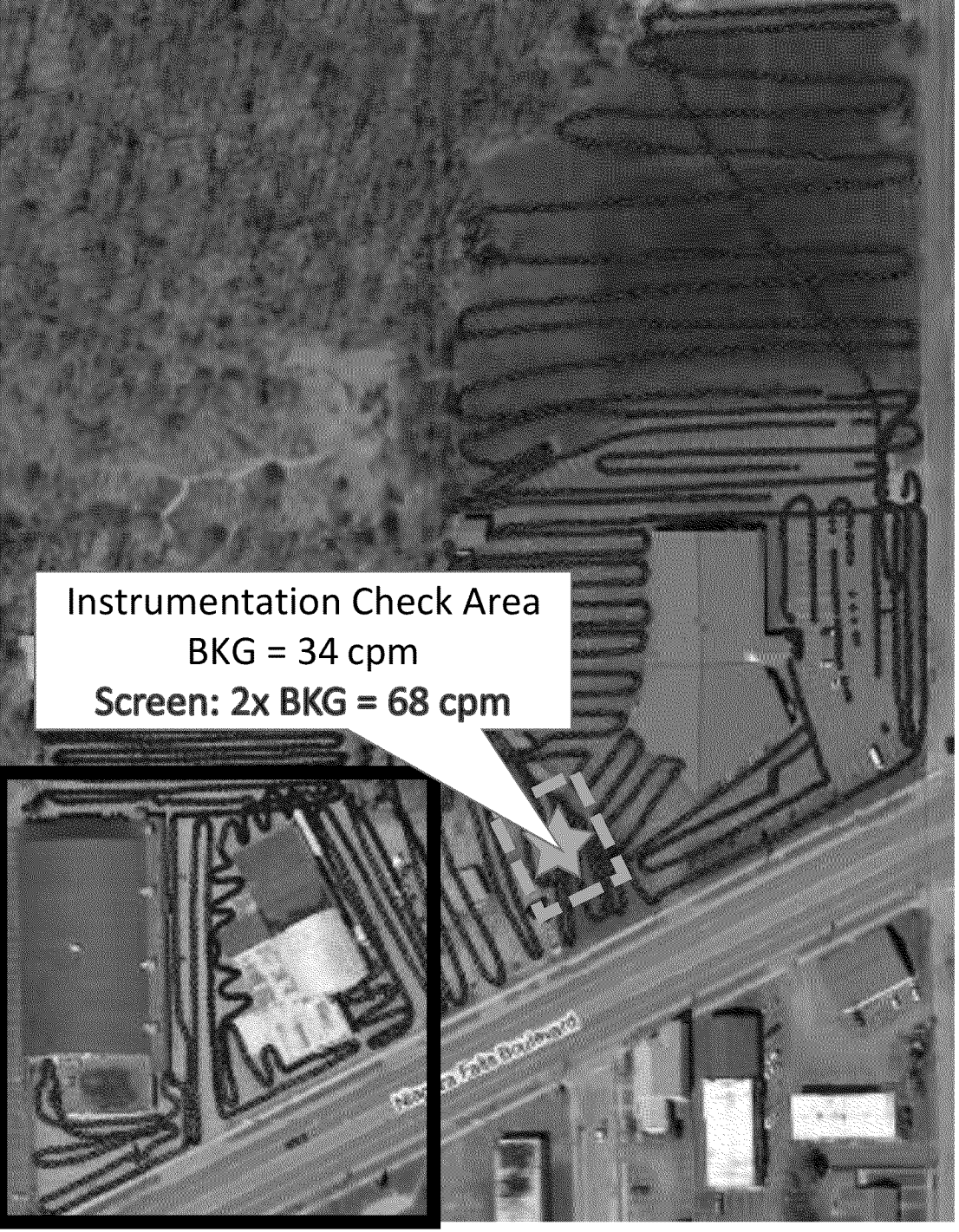
- All samples showed that concrete and pea gravel are NORM not TENORM based on quantitative sampling
- Therefore, since our samples are NORM and not TENORM nor “radioactive materials,” we have satisfied6 CRR-NY IV B PART 380 and PART 360 per the Applicability section of each Subpart

BUT… EPA didn't just stop there…

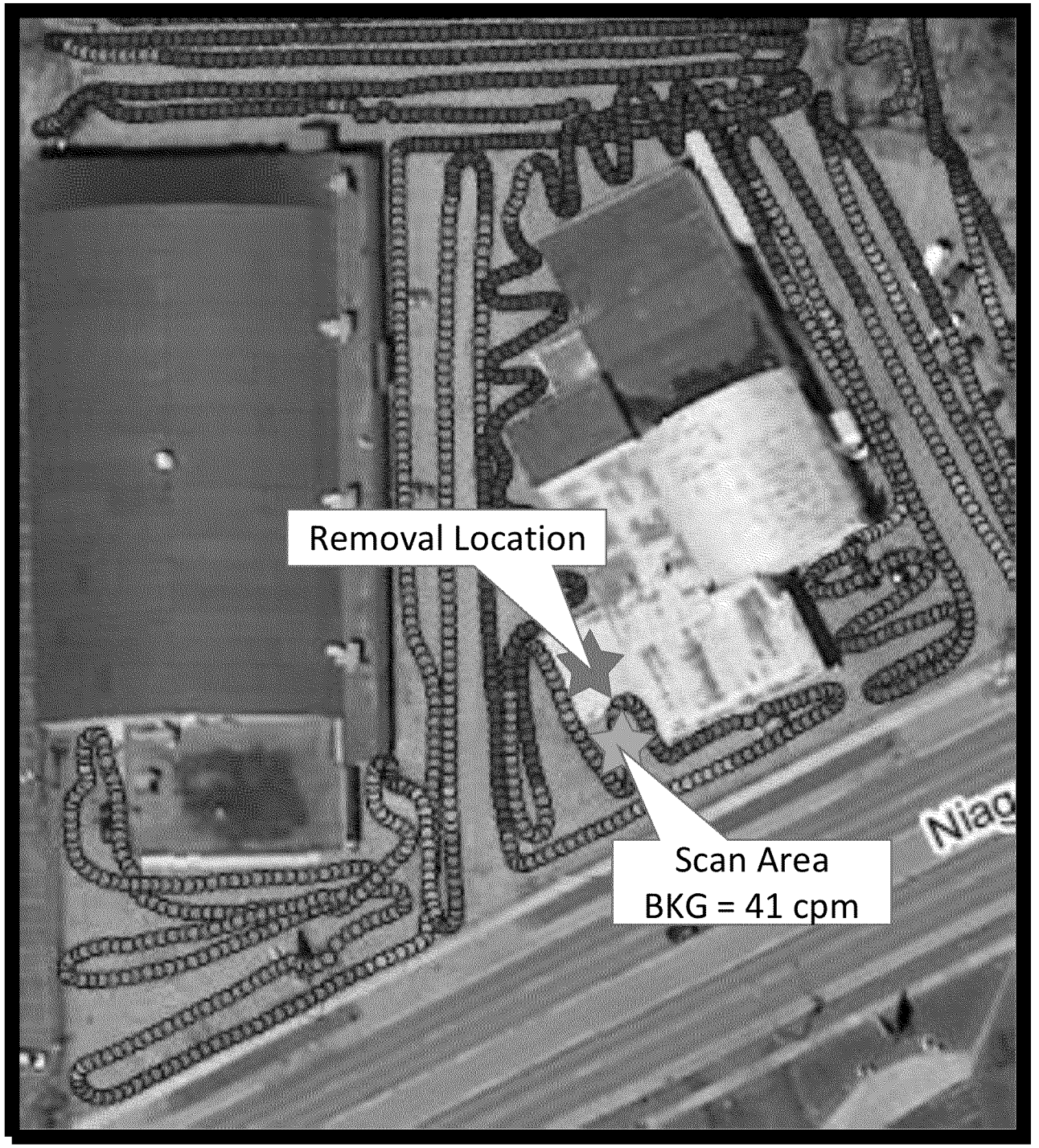
Surface Scan Process

- Our thought process: Hit or no hit!
- Our contaminant of concern is Radium
- Since our pancake probes are calibrated to Cs-137, the pancake would over respond if radium was located on the surface of the concrete
- This would NOT be used to quantify! Qualitative—is it there or not?
- This was a “screening” for us—used mainly for transporting the concrete from the decon area to secured storage container until samples verified not TENORM

So what was our “Screening” limits?


Instrumentation Check Area
BKG = 34 cpm
Screen: 2x BKG = 68 cpm

Screen?


Removal Location
Scan Area
BKG = 41 cpm

Conclusion with Scans

- All scans of concrete and pea gravel came out to be less than the screening value of 68 cpm
- Maximum cpm of concrete and pea gravel: 61 cpm

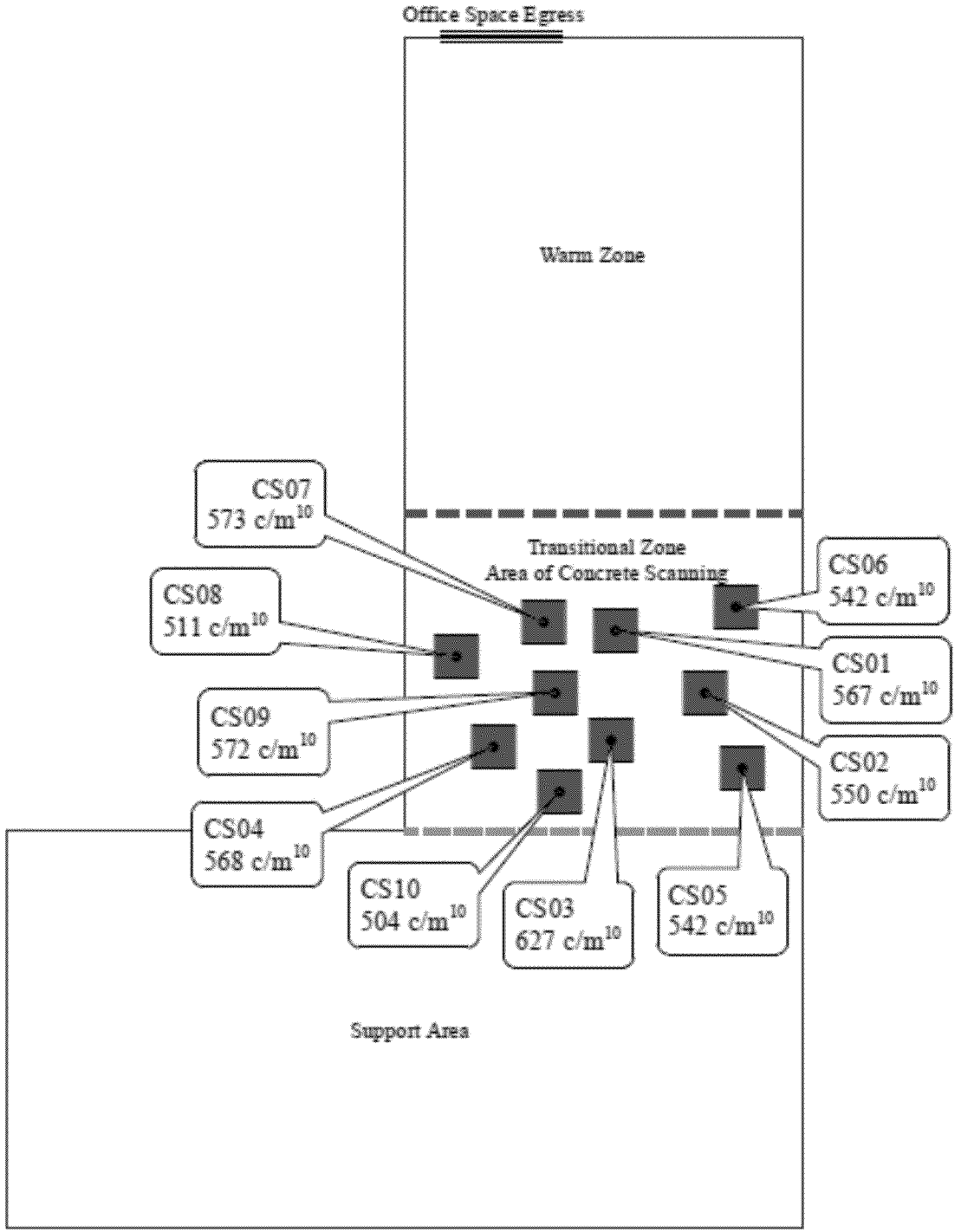
But does it meet the State's suggestion of +/- 2 Standard Deviations above Background?

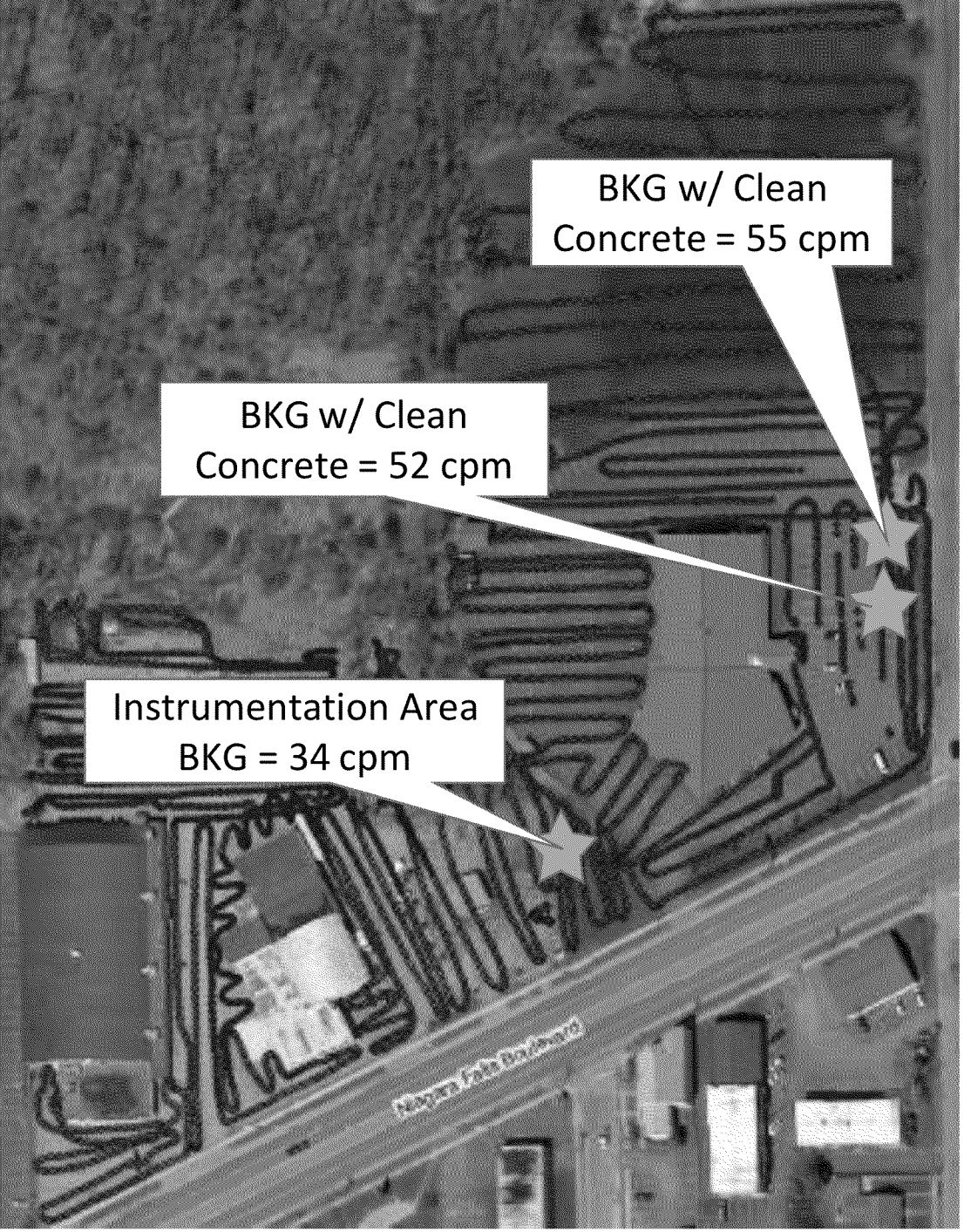
Let’s find a reference area

- Instrument BKG of 34 cpm
  - 2x BKG=68 cpm
- Scanning area BKG of 41 cpm
- Scan area Concrete of 57 cpm

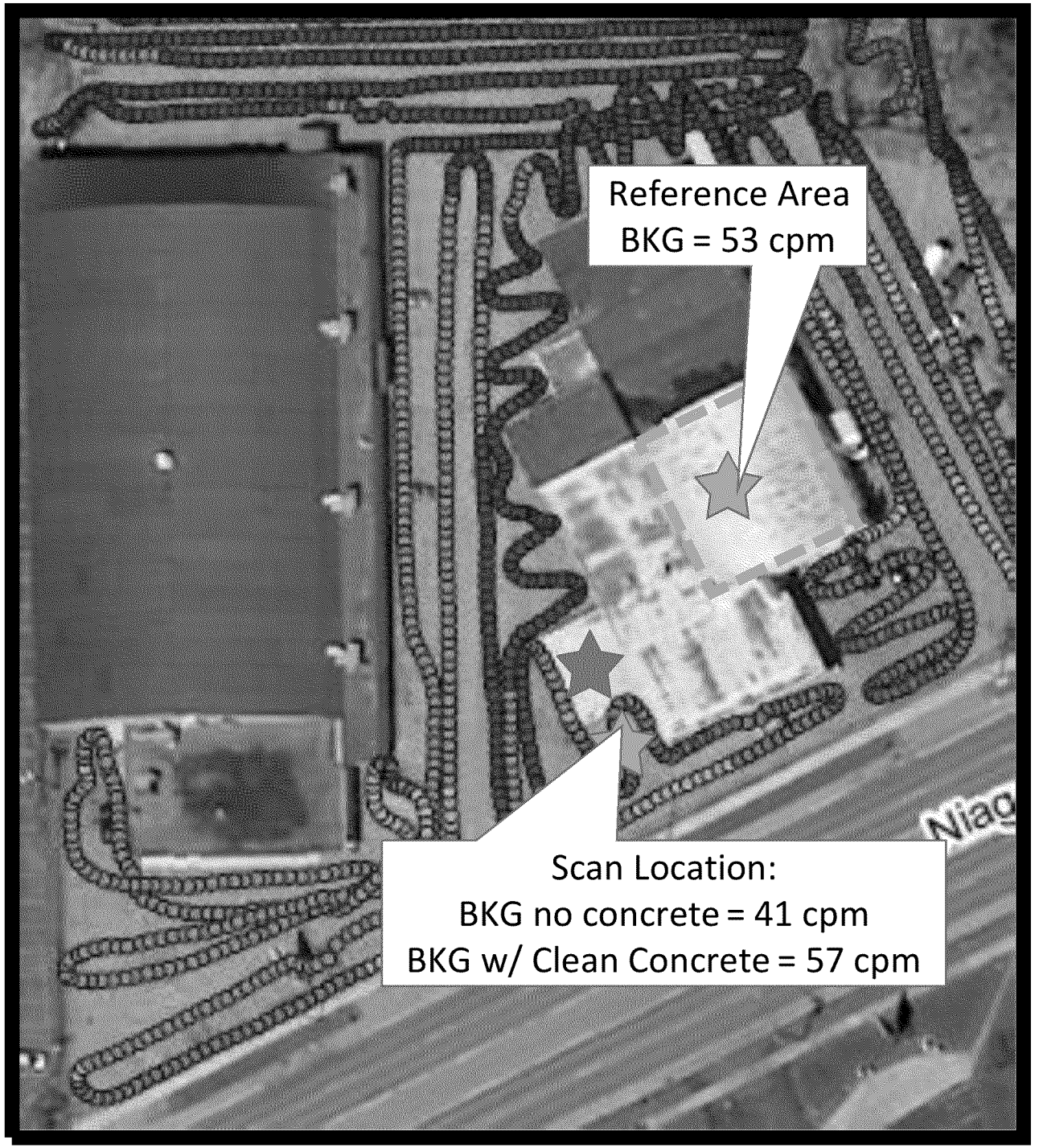
Due to business operations and space, we need to find a reference area:

- Roughly same age of concrete
- Background levels comparable
- Large enough area for multiple measurements

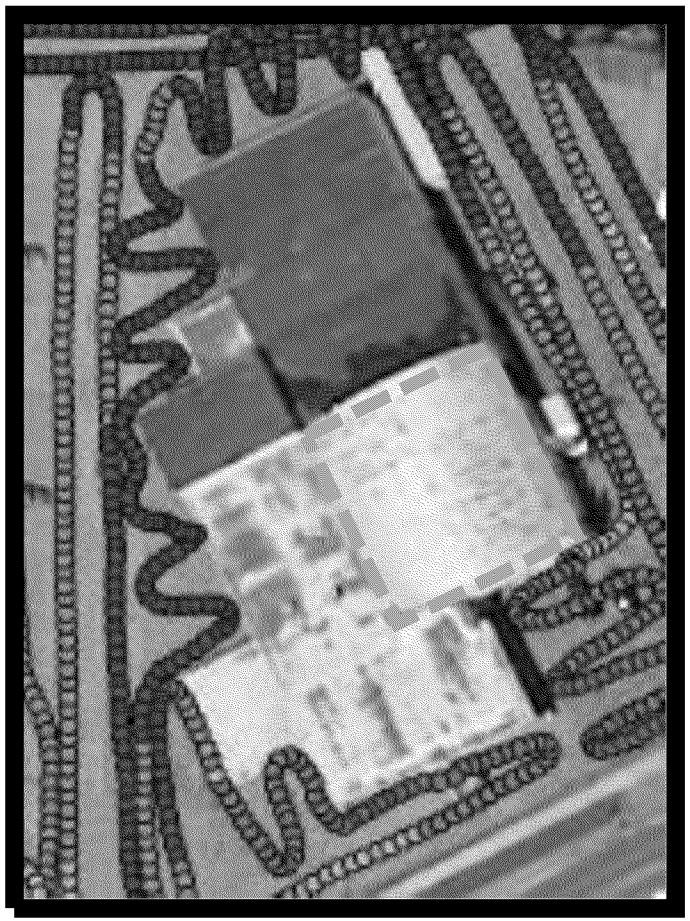


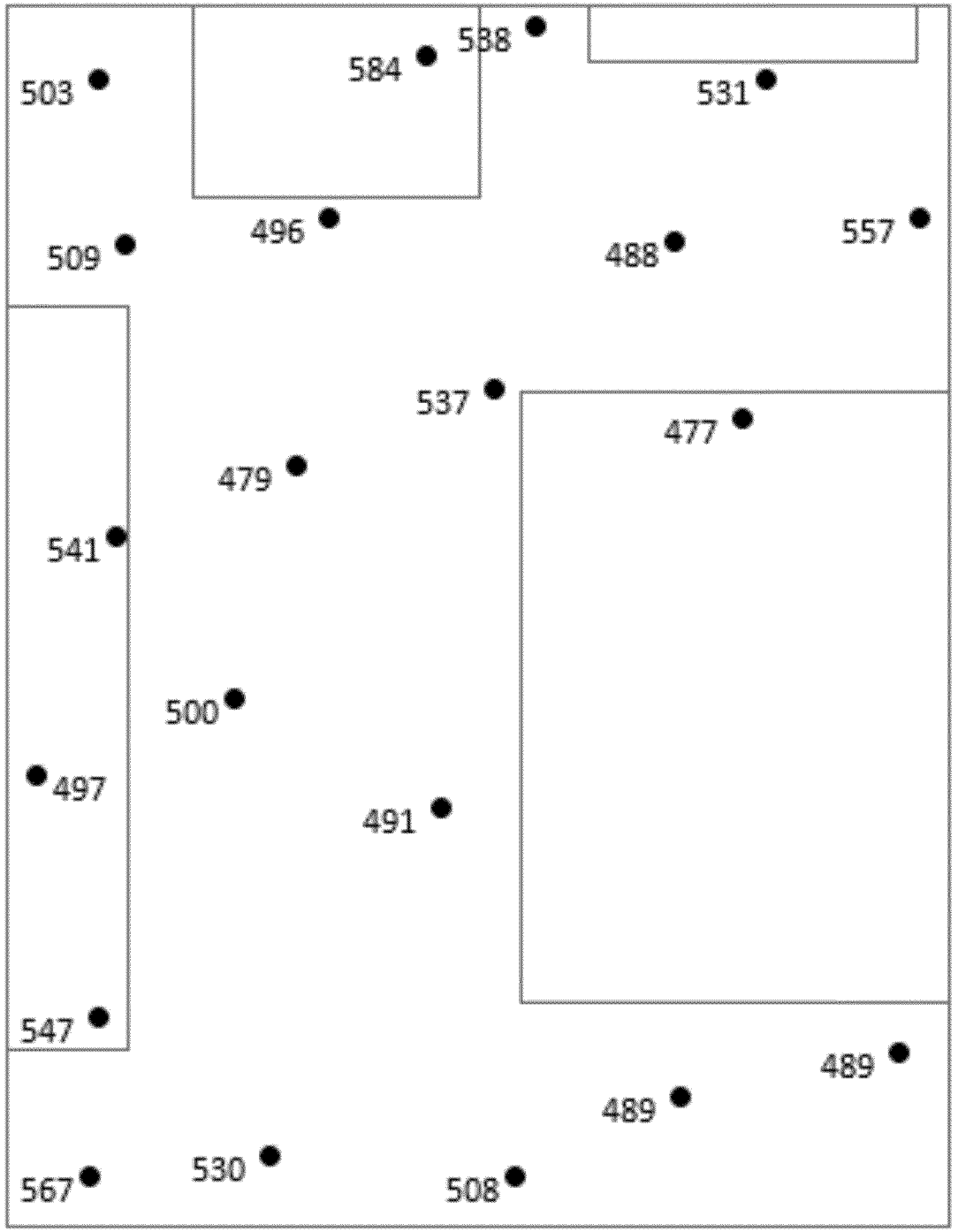

BKG w/ Clean
Concrete = 55 cpm
BKG w/ Clean
Concrete = 52 cpm
Instrumentation Area
BKG = 34 cpm

Screen?

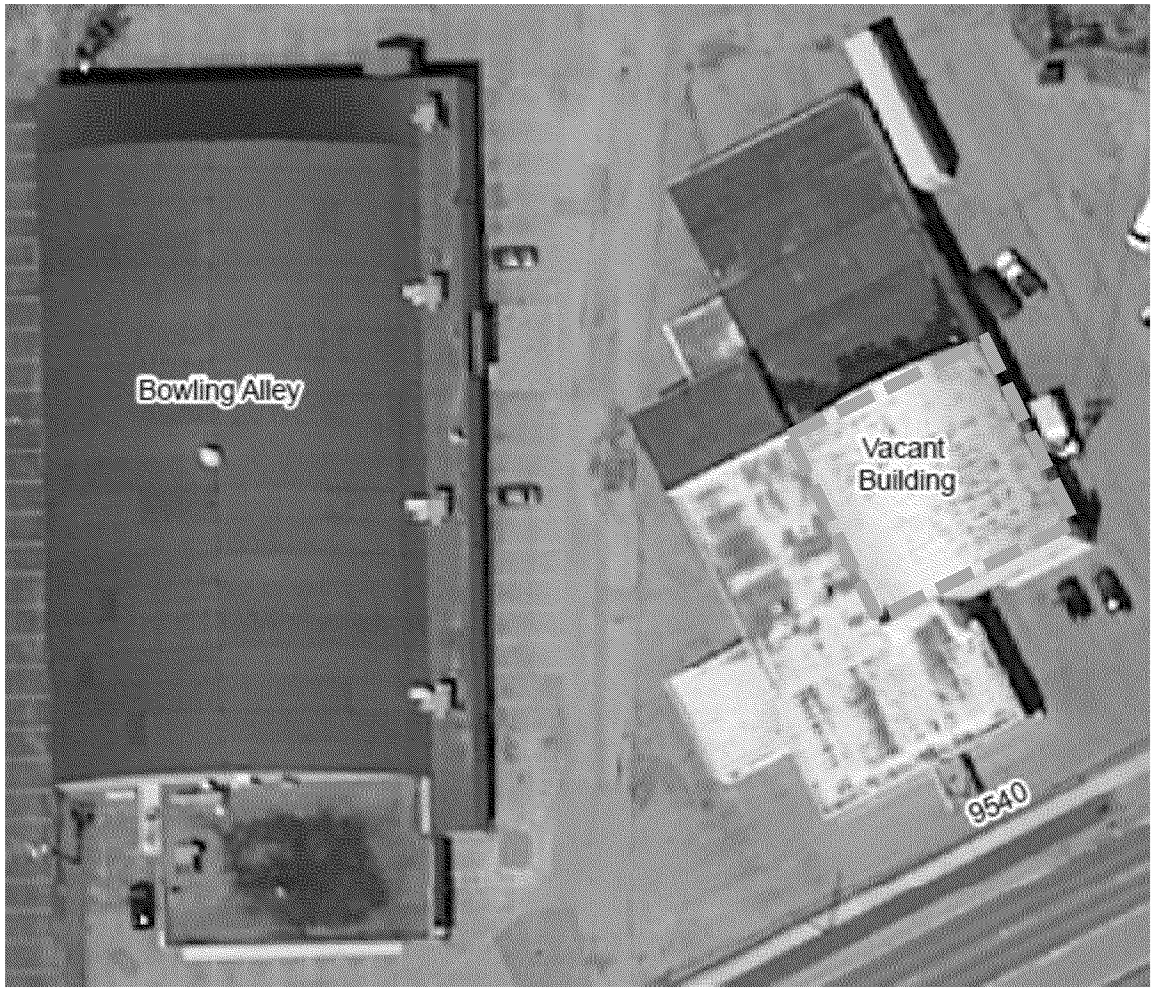

Reference Area
BKG = 53 cpm
Scan Location:
BKG no concrete = 41 cpm
BKG w/ Clean Concrete = 57 cpm

Measurement locations of Reference Area





+/- 2 STD of Reference Room



Background 1	49
Background 2	59
Background 3	54
Background 4	55
Background 5	55
Background 6	53
Background 7	50
Background 8	49
Background 9	50
Background 10	48
Background 11	54
Background 12	48
Background 13	51
Background 14	56
Background 15	54
Background 16	49
Background 17	50
Background 18	51
Background 19	51
Background 20	57
Background 21	50
1 STD	4
Average	53
Average + 2 STD	61

All Scan of concrete were below 61 cpm

+/- 2 STD of Scan Location with concrete

Background 1	58
Background 2	52
Background 3	58
Background 4	57
Background 5	51
Background 6	63
Background 7	55
Background 8	55
Background 9	57
Background 10	55
1 STD	4
Average	57
Average + 2 STD	65

All Scan of concrete were below 65 cpm

Recap of Various Scan Methods

Method	Average cpm	Maximum cpm allowed	Concrete Maximum including background (BKG = 30 cpm)
+/- 2 STD of Instrument	34 cpm	41 cpm	61 cpm
+/- 2 STD of Reference Area	53 cpm	61 cpm	61 cpm
+/- 2 STD of Scan Area	57 cpm	65 cpm	61 cpm
2 x Background of Instrument	34 cpm	34 x 2 = 68 cpm	61 cpm
2 x Background of Reference Area	53 cpm	53 x 2 = 106 cpm	61 cpm
2 x Background of Scan Area	41 cpm	41 x 2 = 82 cpm	61 cpm

Recap of Various Scan Methods

Method	Average cpm	Maximum cpm allowed	Concrete Maximum including background (BKG = 30 cpm)
+/- 2 STD of Instrument	34 cpm	41 cpm	61 cpm
+/- 2 STD of Reference Area	53 cpm	61 cpm	61 cpm
+/- 2 STD of Scan Area	57 cpm	65 cpm	61 cpm
2 x Background of Instrument	34 cpm	34 x 2 = 68 cpm	61 cpm
2 x Background of Reference Area	53 cpm	53 x 2 = 106 cpm	61 cpm
2 x Background of Scan Area	41 cpm	41 x 2 = 82 cpm	61 cpm

Screening value isn't much higher than +/- 2 Standard Deviations

Swipe Samples

- For both Scan and Swipe samples, each piece of concrete was given a unique sample number.
- Recordings of both scan and swipes were documented.
- Swipes were taken on every 10 or so concrete pieces (roughly 5%-10%)
- Swipes samples were counted for 10 minutes on a Ludlum 3030.
- All results were below +/- 2 standard deviations above background